DOCUMENT RESUME

ED 271 024 FL 015 790

AUTHOR Baltra, Armando
TITLE Computer Adventure Games: Toys as Tools for Teaching.
PUB DATE Mar 86
NOTE 8p.; Paper presented at the Annual Meeting of the Teachers of English to Speakers of Other Languages (20th, Anaheim, CA, March 3-8, 1986).
PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Classroom Techniques; *Communicative Competence (Languages); *Computer Assisted Instruction; Computer Oriented Programs; *Computer Software; Discovery Learning; *English (Second Language); *Games; Learning Processes; *Media Selection; Microcomputers; Second Language Instruction; Student Motivation

ABSTRACT

Adventure games designed for use on home computers are a potentially powerful instructional resource in English as a second language because they promote problem-solving using the target language and are highly motivating to students. The games, whose objective is usually for the user to defeat an obscure force and recover a precious object, are varied in design, and are most suitable for the development of communicative fluency in the language when they (1) do not focus on the mere manipulation of vocabulary and/or grammatical forms, (2) encourage meaningful discovery learning without ignoring meaningful reception learning, (3) create opportunities for interpersonal interaction, and (4) integrate communicative abilities. Research has found challenge, fantasy, and curiosity to be the most crucial motivating factors. Elements of computer games that will contribute to second language learning include clear goals, use of language to achieve the goals but not as the goals themselves, feedback, an uncertain outcome, multiple difficulty levels, use of hidden information as a communicative device, unpredictability, randomness, and engaging the user's curiosity and search for novelty. Teachers can use these criteria to find effective materials and to help in the development of new or improved software. (MSE)

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COMPUTER ADVENTURE GAMES: TOYS AS TOOLS FOR TEACHING

ARMANDO BALTRA, Ph.D.

PAPER PRESENTED AT THE 20th TESOL CONVENTION
ANAHEIM, CALIFORNIA. MARCH 1986

(A) INTRODUCTION

CHILDREN'S LEARNING ABILITY.

Playing is a very old and widespread form of learning and young children do their learning mainly through games, or game-like activities. It is true that the educational activities in the early school years try to simulate games, but the external reward and punishment which is normally inherent in these educational activities tend to take away the non-threatening atmosphere of the original game.

When children, who are naturally avid, eager, and successful learners, get to school, the system seems to stifle these urges and learning tends to become impaired. Somehow, the organization of academic work in school acts to keep down the amount of effort and attention a student gives to academic pursuits as compared to extracurricular activities. In a way, the game is over at school because the intrinsic motivation to learn is apparently lost. Krashen would say that the threatening atmosphere which is created in school increases the affective filter and, consequently, hinders the learning process (Krashen, 1982).

COMPUTER GAMES AND CHILDREN.

However, the children's innate ability to learn remains unchanged when they engage in their own extracurricular games, or when school activities are fun for them. And this is clearly the case with computer games. Computer games bring up the one strength which almost all students, even the poor ones, have in common: The desire to have fun. Children are motivated, inventive, and even industrious when it comes to having a good time (Rowe, 1983). In addition, they have no difficulty distinguishing between what is fun and what is boring. We have all seen children at the local video arcade spending their weekly allowance learning how to control space ships, laser guns and all sorts of computerized devices. These video arcade games, which typically require good motor skills and quick reaction time, do not normally involve direct use of language. But, because they have proved to be so successful with young students, some of the techniques involved have been adapted in some CALL programs for drill-and-practice activities.

There is also another broad type of games available for the home computer which are basically designed around problem-solving activities and thus require careful planning, thinking, and note-taking. The now highly popular theme of dungeons and dragons, to mention only one of these, has found in the home computer an excellent way of actively engaging the player in the essence of adventure. Thus games like WIZARDRY, ZORK, ULTIMA, ADVENTURE, and ENCHANTER have become classic in the history of the home computer.

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It is nowadays clear that there are two different but complementary aspects of EFL learning: developing linguistic accuracy, and communicative fluency. The first one involves handling exact combinations of a lexical and syntactic nature. Developing fluency, on the other hand, is what students do when they carry out activities which are focussed on those communicative features which speakers use in order to convey their message efficiently (Baltra, 1984a).

My interest in computer adventure games lies in the fact that they can promote the development of communicative fluency, because in these activities we have the machine not in a language teaching situation, but creating circumstances where learning can occur. Since problem-solving activities have proved to be effective ways of developing communicative competence in the language classroom

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(Littlewood, 1981), and students are intrinsically interested in playing computer games, we have here an untapped source of motivating activities for the language classroom.

WHAT IS A COMPUTER ADVENTURE GAME?

An adventure game typically starts with the sentence: "You are in the middle of an old and dusty crossroads going north, south, west, and east." The player then types: "Go" plus one of the cardinal points, and the adventure begins across lakes, forests, caves, and castles. The objective is usually to defeat some obscure force and recover some precious object. Some adventure games present graphics and display four lines of text at the bottom of the screen. Other games have only screens full of text that tell the players where they are, the objects which are visible in that place, and the exits available. The game typically gives information about the objects the players are carrying, and reports about the general status of the game development (i.e., how much money is left, the strength the players still have, the score achieved, etc.)

(B) THE SUITABILITY OF COMPUTER ADVENTURE GAMES FOR LANGUAGE LEARNING

In my view, these latter types of computer games are suitable for the development of communicative fluency in language learning when they:

1) are not centered on language USAGE (Widdowson, 1978). That is, the central objective is not the mere manipulation of vocabulary and/or grammatical forms.
2) encourage meaningful discovery learning, without leaving entirely aside meaningful reception learning. In addition, when students cannot comprehend the new material for themselves, they should be sparingly provided with enough information so that they can continue with the learning activity. This task should not necessarily be entirely controlled by the computer, so as to encourage point 3) below.
3) create opportunities for student-to-student group interaction, rather than exclusive student-machine relation. The programs should allow for group dynamics whereby the learning is centered on the student, rather than on the computer, or on the teacher.
4) integrate the four communicative abilities. That is, by providing motivating situations, the games should also give scope for oral group interaction, generated by a reading text, and for writing as a follow-up activity. Notice that, in this view, the computer is creating opportunities for learning and is also acting as a word processing tool for writing.

These four parameters cut across various types of computer software since they encompass not only problem-solving games like those which explore the world of mysterious mansions, dungeons and dragons, or science-fiction, but also programs which simulate the running of a lemonade stand (LEMONADE), the ecosystem of a lake (THE POND), or a journey across the unknown seas of the 17th century (INTO THE UNKNOWN), to mention some. ANIMALS, a game where students build a hierarchic classification of the animal kingdom, would also be considered an adventure within this framework because it matches the above four parameters.

(C) COMPUTER GAMES AS TOYS

The research of Thomas Malone (1981) is beginning to show new horizons towards identifying the motivating essence of computer games. Malone identified certain characteristics of these games that seem to make them intrinsically motivating. More than 100 people playing computer games were studied systematically, looking primarily at what made the games fun. From this came some factors which he considered necessary to high motivation. I will first present his main findings and then I will proceed to the main objective of this paper, which is to comment on their educational potential together with their implications for the development of more effective CALL.

Malone sees challenge, fantasy and curiosity as the most crucial factors which make computer games fun. Let us take each one of these in detail.

1.- AN ENVIRONMENT IS CHALLENGING IF IT PROVIDES A MOTIVATING GOAL AND CONSTANT FEEDBACK.

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Malone says that games are intrinsically motivating if the goal is clear, and if the skills required for the activity are used as a means to achieve the goal, but are not the goal itself. Notice that, because of the strong concern with language manipulation, most current CALL software does not follow this principle. Furthermore, he states that, to keep the level of motivation, learners need some sort of feedback to know whether or not they are achieving the stated goal. It is interesting to compare the way games do this as opposed to traditional CAI lessons. While the latter tend to display statements of the "wrong, try again" type, adventure games do not give evaluation messages. They either do not perform the required task, or they reward the players by moving on into another location, revealing hidden messages, opening traps, or destroying the enemy.

2.- AN ENVIRONMENT IS CHALLENGING IF THE ATTAINMENT OF THE GOAL IS UNCERTAIN, AND IF THERE ARE MULTIPLE LEVEL GOALS.

Malone states that one of the reasons why competition is motivating is because it provides a challenge at an appropriate difficulty level. He also feels that there must be an adequate balance between the chances of achieving the goal or not. And, since uncertain goals are directly proportional to difficulty, it is important to ensure that the game not be too difficult, nor too easy, for the players.

Another way of keeping a motivating degree of challenge in a game is when the program not only provides multiple level goals, but also has been designed in a way that the level of difficulty of the whole game, or some aspects of it, can be chosen by the player.

3.- AN ENVIRONMENT IS CHALLENGING IF PART OF THE INFORMATION NEEDED TO ATTAIN THE GOAL IS HIDDEN.

Almost all adventure games contain hidden information which is only revealed after solving a puzzle of some kind. This feature can be a further powerful source of interest for the students, because the challenge, and the motivation to continue playing, is gradually increased as they discover new information.

4.- AN ENVIRONMENT IS CHALLENGING IF IT PRESENTS UNPREDICTABLE OUTCOMES

A final ingredient which makes the goal uncertain is the fact that many adventures display unpredictable outcomes at various points. "Being killed" in a game brings the fun inherent in the psychological safety of being able to start the adventure again with the acquired knowledge of what to avoid in the future.

5.- THE ROLE OF FANTASY AND CURIOSITY

Malone reports how fantasy contributes to enhance motivation in the game. He defines fantasy as "mental images of things not present to the sense or within the actual experience of the person involved.... which may or may not be likely to occur in the learner's environment." (Malone, 1981:360). Fantasies tend to increase our imagination and stir our curiosity, which is the other important ingredient of successful computer games. Malone claims that the way to engage the learners' curiosity is to present just enough information to make their existing knowledge seem incomplete. This will increase the students' interest to find out more in order to complete their knowledge.

(D) COMPUTER GAMES AS TOOLS FOR TEACHING

Before exploring the relevance of Malone's findings to our educational enquiry it is important to state two points about his work. First, he looked at computer games in general and thus included the quick reaction video arcade types together with the adventure games which require careful thinking and planning. Second, he is very cautious in his claims, and clearly states that he was concerned primarily with what makes these programs fun, and not what makes them educational. In the spirit of this paper, I want to be more adventurous and explore the mysterious connections between fun and education.

The investigation of what makes computer games fun offers interesting new light to the study of the essence of motivation. The line between work and fun, and all the pedagogical connotations those two concepts carry, is apparently beginning to be drawn from the point of view of educational psychology. We all normally look forward to doing activities which are fun for us. And we all label as work those

activities which we would not be doing if we had a choice. While fun is something you do out of sheer enjoyment, work is something you do because you must.

I think few informed educators would seriously question the educational implications of these differences. By ensuring fun we are also ensuring comprehensible input in a low anxiety atmosphere. And there is a great deal of literature now available showing that this promotes the acquisition of knowledge.

Educational material which is intrinsically motivating should pave the way to successful learning, and thus Malone's research seems to have crucial implications for the development not only of educational computer games, but also of more effective Computer Assisted Language Learning projects. This knowledge would enable software designers and teachers not only to point out the weaknesses of current CALL software, but it would also place them in a better position to suggest ways to improve the material already available.

Let us now comment on the relationship between the findings of the above investigation and CALL.

1.- ESTABLISH CLEAR GOALS

Educators have long recognized the importance not only of establishing clear goals, but also of ascertaining that the students are fully aware of them. Some computer learning packages do incorporate this principle, but it is not a very common feature to be found in educational software. Perhaps we should ensure that all CALL material, directly or not, conforms to establishing clear goals.

2.- LANGUAGE IS USED TO ACHIEVE THE GOAL, BUT IS NOT THE GOAL ITSELF.

Malone's notion that games are intrinsically motivating if the skills being taught are not the goal itself is an important concept which can be directly matched with current communicative theory. It then follows that CALL software will be more efficient when the various aspects of language are used as a means to achieve a given goal, but are not the goal itself. And it is comforting to see slowly growing amounts of new material following this approach.

3.- FEEDBACK

It seems to me that the best possible feedback students can have is when the learning activity has been structured in a way that students can see for themselves whether or not the goal is being attained. Unsolicited evaluation messages of the "Wrong, try again," or "Fantastic!!" are types of feedback which still remain from the traditional programmed instruction approaches. However, because some students do need "the pat on the back," the program might ask something like: "Would you like to see how well you are doing?" and then display some sort of guidance for those who answer yes. Alternatively, if students repeatedly fail to achieve their objective, the program could provide some hints (perhaps by means of a HELP function), or the teacher could guide the students back to the right track.

4.- UNCERTAIN OUTCOME

We saw that uncertain outcomes encourage intrinsic motivation and that they are directly proportional to levels of difficulty. This is one of the most serious caveats when we try to use the popular adventure games mentioned above. Because the majority of these games are far too difficult for non-native speakers of English, we have an almost complete certainty that the goal will not be reached. Grabe & Dosmann quite rightly criticise most adventure games, arguing that the puzzles are so complex that they can easily develop frustration in the learners (Grabe & Dosmann, 1986). They then propose help routines in the program which can be called on when the users get stuck.

Grabe & Dosmann are certainly correct in thinking of ways to avoid undesirable feelings of frustration in the students. However, their solution does not give the teacher any role in the learning activity, and thus they seem to be thinking in terms of exclusive machine-student interaction. We would also have the extra problem that a programmer cannot easily decide on how much information to give so as to keep the delicate balance between challenge and frustration. It would then seem better to give this responsibility to the teachers and let them provide information clues as needed to the students. This

approach has the extra advantage of increasing social interaction in the classroom where teachers and students use language communicatively to accomplish the task (Baltra, 1984b).

5.- MULTIPLE LEVELS OF DIFFICULTY

Programs that include multiple levels of difficulty retain the challenge which is so necessary to motivation and the desire to carry out a task. Furthermore, once the students have succeeded while working at a simple level, there is always the challenge to try the task again at a more demanding level. In OREGON TRAIL, for instance, the players can decide how good they are at shooting when they hunt for food along the way to Oregon, and thus adjust the level of challenge the game presents. In BACK HOME, a program that synchronizes a cassette and the computer to work with songs, the students can choose how much text they wish to see on the screen before they attempt filling in the blanks. CLOZEMASTER presents similar choices for the students.

6.- USING HIDDEN INFORMATION AS A COMMUNICATIVE DEVICE.

Providing opportunities for students to discover information which is not readily available seems to give a psychological feeling that one must earn the access to new knowledge through one's own personal effort. This technique will not only increase motivation, but also will encourage students to study more closely the text being presented to them.

In addition, students are highly motivated to tackle whatever new language the text may contain because they know that the new information thus revealed might be crucial to the game development. Notice that, in this way, students are working with language not as an end in itself, but as a medium to achieve a communicative goal, namely, to understand the text in order to advance in the game. It should be, once again, the teacher's task to guide the students who are stuck by providing them with hints concerning hidden information.

It is true that teachers using currently available games are rarely in a position to adapt the text in these hidden messages. But, as more software is being developed along these lines, this would be a very good opportunity to ensure that the language being displayed follows Krashen's i+1 theory. That is, the comprehensible input provided to the students is slightly beyond their linguistic competence. Students are, in this way, exposed to language which is more advanced than their present level of knowledge, yet within their linguistic potential. From the viewpoint of software development, designers of educational programs have in this hidden information technique a powerful and creative strategy to sustain intrinsic motivation to acquire new language.

7.- UNPREDICTABLE OUTCOMES

There is no doubt that unpredictability increases the students' interest in the activity. Besides, the written information presented during the game acquires new meaning in the light of previous experience and students learn to pay more attention to details while reading the texts.

Most CALL courseware tends to be too predictable to reach an adequate level of challenge. In addition, the games that some of these programs include are not an intrinsic part of the learning component, but simply a reward for those students who successfully master the lesson objective. Besides not having any unpredictable features which could qualify as a sort of hidden information for the students to discover, these games are largely disguised drills of the teaching point of the lesson. This language oriented approach could be considered effective when the overall objective of the learning package is centered on grammatical accuracy. It is, however, unsuitable for those computer activities which have as a main goal the development of communicative fluency (i.e., when language is used only as a medium to achieve a communicative task).

8.- RANDOMNESS

The introduction of a certain degree of randomness in the activity is another feature which will increase uncertainty. Testing programs make extensive use of this in connection with the order of item presentation and also with distractors in multiple choice items, to mention some examples. Games like HANGMAN, for instance, select the word to be guessed using a randomizing algorithm. But the possibilites do not end here. Randomness could be used to alter the map in an adventure game, or to place objects in different locations in different games (and to adjust the hidden messages

accordingly). In the game THE COUNT, for instance, "things change" between night and day, and between successive days in the game, thus adding to the intrinsic motivation of the game.

In reading comprehension, randomness could also be used to ensure variety. Thus, it may be possible to design a story framework with slots to be filled in by information about characters and/or events taken from a data bank. The program would then randomly choose which thematical variation to present to the reader. This is an instance of "the machine deciding what to show." I am aware of the technical difficulties involved in designing a program that will generate coherent and and meaningful story lines in this way. But we could turn this caveat into a plus if we ask students to look for possible incoherences and, with a word processor, make the necessary alterations. This is one of the many instances where the limitations of present day computers are being used as a pedagogical advantage. This activity will also stress the notion that the computer is just a tool, not a master, and that they are in control of the machine.

9.- CURIOSITY AND THE SEARCH FOR NOVELTY AND SURPRISE

We have seen that one way to engage the learners' curiosity is to present just enough information to make their existing knowledge seem incomplete. This view ties in with the way in which the information gap theory is currently applied to create communicative activities in the classroom. Thus, learners are presented with tasks whose completion creates an intrinsic need to obtain new information from external sources. This situation leads directly to communicative interaction, whereby the student interacts not only with peers and teachers, but also uses tape recorders, video, books, dictionaries, or computers, in order to obtain the knowledge necessary to achieve the goal. It is in these roles, that is, the computer as an enhancer of curiosity and as a source of information, that I see one of the most interesting possibilities in the use of the micros for CALL.

In the large majority of presently available CALL software, novelty and surprise, key factors which arouse curiosity in the player's mind, tend to wear out quickly, probably because most merely do drill-and-practice, or give and test information. Computer games avoid this by encouraging discovery learning. By having to make decisions and then face their consequences, the player is engaged in the activity more directly than in traditional CALL.

(E) THE POWER OF COMPUTER ADVENTURE GAMES IN THE SCHOOL

Teachers have in these games powerful tools for language learning since they can encourage the development of communicative fluency in ESL/EFL through lively discussions, reading, vocabulary building, note taking and even essay writing. This can be done in the classroom by placing three or four students in front of a computer and encouraging them to establish group consensus, make maps and decide, in general, the next course of action, all classical examples of group dynamics. From another point of view, the activities created by these games are largely student centered, since the teacher typically ceases to be in full control of learning, becoming a guide and a facilitator. In this way students do not learn by being taught, but by experiencing the consequences of their actions. And finally, these games encourage the development of a kind of learning that is more closely related to one's idea of fun than what is normally experienced with more traditional academic approaches.

Software publishers inevitably follow the market trends. We can only regret that, in the case of foreign and second language software, this trend still seems to be almost exclusively the development of linguistic accuracy, that is, vocabulary building and the manipulation of grammar. It then follows that, with some notable exceptions, there is still a gap between what is available in the computer market and what those teachers well acquainted with the present theories of language learning would like to have for their students.

We have then two main tasks ahead. First the need to encourage the production of computer adventure games specially designed for ESL/EFL students by showing, to both teachers and publishers, why this type of software can be successful. And second, to support this production by describing possible communicative activities which could be carried out with these programs.

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THE AUTHOR

Armando Baltra is an Assistant Professor in the Department of English at the Catholic University of Sao Paulo, Brazil; and former Coordinator of the Computer Learning Center at the Centro Eletronico de Linguas of that city (CEL-LEP). He has taught EFL for nearly 20 years in Chile, England, and Brazil, and is currently engaged in research on the theory and practice of Computer Assisted Language Learning. He is at the moment a visiting faculty member in both the Department of Spanish and Portuguese, and in the Program in Linguistics of the University of California, Irvine. Irvine, CA 92717.

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